Recruitment of Non-Teaching Positions

Selection process for recruitment to the post of Technician

[Advt No. Estt./2022/Gr_C5/2011 dated 17.10.2022]

Following shall be the selection process, scheme of examination, written test, syllabus, manner for finalselection of candidates to the post of Technician (7th CPC Pay Level 3) by direct recruitment:

Stage	Type of Examination	Time	Maximum Marks
Stage - 1	**Multiple Choice Based Screening Test(MCQ-I)** (Paper-I) For screening the candidates for Paper-II (Stage-2)	90 Minutes	150 Marks (75 questions)
Stage - 2	**Multiple Choice Based Main Test (MCQ-II)** (domain specific of the post) (Paper-II), **Final selection based on Marks secured in Paper-II (Stage-2)**	120 Minutes	200 Marks (Part A - 20 questions Part B - 80 questions)
*Note: - Question papers will be in the **English** language **only**. All questions of Paper I and Paper II will be Objective type. For every wrong answer, there will be negative marking @ 1/4th marks for each wrong answer. Compensatory time for Persons with Benchmark Disabilities (Divyangjan) will be provided as per the extant orders of Government of India.*			

A. Scheme of Examination

Paper-I: Multiple Choice Based Written Examination of 90-minutes duration (for screening the candidates for Paper-II Examination (Stage-2), Maximum marks 150). The examination for Paper-I (stage-1) shall be conducted first. Those candidates who will qualify in Paper-I shall only be eligible to appear for Paper-II (Stage-2). All the candidates are required to asses themselves before appearing in the written test about fulfilling eligibility for the post applied for. The eligibility and document verification of candidates will be assessed after evaluation of Paper–I examination. The shortlisting of candidates for stage-2 will be subject to limit of 12 times of the available advertised posts in the respective category. If the number of candidates qualifying in Paper-1 is more than 12 times, the shortlisting of candidates for Paper-2 (Stage-2) will be restricted to 12 times of the available advertised posts in the respective category. This number may increase in case of tie in the marks of paper-1 of the respective category and may decrease as per availability of candidates with qualifying marks in respective category. The Paper-II test (Stage-2) will be held after declaration of eligible shortlisted candidates after Paper-1 (Stage-1) examination. The indicative syllabus for paper-1 examination is as under:

(a) **General Knowledge & Awareness:** Includes questions relating to History, Indian Polity & Constitution, Art & Culture, Geography, Economics, General Policy, Science & Scientific Research, National/International Organizations /Institutions, current events, environment etc.

(b) **Quantitative Aptitude**- Includes questions relating to Simplification, Decimals, Fractions, L.C.M., H.C.F., Ratio & Proportion, Percentage, Average, Profit & Loss, Discount, Simple & Compound Interest, Mensuration, Time & Work, Time & Distance, Tables & Graphs, etc.

(c) **Reasoning Ability:** Includes questions relating to both verbal and non-verbal types, analogies, similarities, differences, space visualization, problem solving, analysis, judgment, decision making, visual memory, discrimination, observation, relationship, concepts, arithmetical reasoning, verbal and figure classification, arithmetical number series etc.

(d) **General English:** Includes questions on Antonyms, Synonyms, Spelling Check, Active/Passive Voice, Spotting Errors, Sentence Improvement, One Word Substitutes, Selecting Words, Sentence Corrections, Idioms and Phrases, Common Error Detection, Ordering of Words, Verbal Analogies, Sentence Formation, Completing Statements, Change of Speech.

(e) **Computer Fundamentals:** Includes questions on Operating System, MS Office, MS Word, MS Excel, Power Point, Tally, Internet, E-mail, Antivirus and various online tools used in day-to-day office work.

(f) **General Science:** The syllabus under this shall cover Physics, Chemistry and Life Sciences of 10th standard level.

B. Paper-II: Multiple Choice Based Main Test (MCQ-II) (200 Marks – 120 Minutes duration, Final selection based on Marks secured in Paper-II (Stage-2)). The minimum qualifying marks for Paper-II shall be 40% for UR & EWS, 36% for OBC, 32% for SC & ST, 28% for PwBD. Relaxed qualifying marks shall be applicable only for reserved category posts of respective category. The examination for paper-2 shall be held after declaration of result of Paper-I (Stage-1). Paper-II shall have two parts, i.e. Part A and Part B as detailed below:

INDICATIVE SYLLABUS (PAPER-II)

Part-A (20 questions)

Mathematics

- Number system, BODMAS, Decimals,
- Fractions, LCM, HCF, Ratio and Proportion,
- Percentages, Mensuration, Time and Work; Time and Distance,
- Simple and Compound Interest, Profit and Loss,
- Algebra, Geometry and Trigonometry, Elementary Statistics,
- Square Root, Age Calculations, Calendar & Clock etc.

General Intelligence and Reasoning

- Analogies, Alphabetical and Number Series,
- Coding and Decoding, Mathematical operations,
- Relationships, Syllogism, Jumbling,
- Venn Diagram, Data Interpretation and Sufficiency,
- Conclusions and decision making,
- Similarities and differences, Analytical reasoning,
- Classification, Directions, Statement – Arguments and Assumptions etc

Basic Science and Engineering

- Engineering Drawing (Projections, Views, Drawing Instruments, Lines, Geometric figures, Symbolic Representation),
- Units, Measurements, Mass Weight and Density, Work Power and Energy, Speed and Velocity, Heat and Temperature,
- Basic Electricity, Levers and Simple Machines, Occupational Safety and Health, Environment Education, IT Literacy etc

General Awareness on Current Affairs

- Science & Technology, Sports, Culture, Personalities, Economics, Politics and any other subjects of importance

PART-B (80 questions)

Engineering Discipline	Objective questions on relevant trade forPART B of Paper-II
Electronics / Electrical / Instrumentation Engineering and combination of various streams of Electronics / Electrical / Instrumentation Engineering	**Electrical, Electronics and Instrumentation Engineering** 1. **Computer awareness:** Basic knowledge of Computer Applications, viz; MS Word, MS Excel, Power Point etc. Internet, MS-DOS, Computer Generation & Development, UNIX, Windows, Lotus, SmartSuite, Data Entry, Softwares knowledge, Networking Platforms, applications of computers in electrical engineering 2. **Basic concepts:** Concepts of resistance, inductance, capacitance, and various factors affecting them. Concepts of current, voltage, power, energy and their units., Kirchhoff 's law, Simple Circuit solution using network theorems. Concepts of flux, mmf, reluctance, Magnetic calculations for conductors of different configuration e.g. straight, circular, solenoidal, etc. Electromagnetic induction, self and mutual induction. Instantaneous, peak, R.M.S. and average values of alternating waves, Representation of sinusoidal wave form, simple seriesand parallel AC Circuits consisting of R.L. and C, Resonance, Tank Circuit. Poly Phase system – star and delta connection, 3 phase power, DC and sinusoidal response of R-Land R-C circuit. 3. **Fundamentals of Electronics Engineering:** Semiconductor Diode, PN junction, basic principles of operation and VI characteristics of PN junction diode, static and dynamic resistance of a diode. Applications of Diode Use of a diode in rectifiers, half wave, full wave and bridge rectifier with shunt capacitor filter, series inductor filter, zener diode and its applications, as a voltage regulator, light emitting diode (LED), Transistor: Introduction to a transistor, working of a PNP and NPN transistor, input and output characteristics, transistor configurations. 4. **Digital Electronics: Digital Electronics** 1. Number System. 2. Binary addition, subtraction, multiplication and division including binary points 3. Logic Gates and Families a) Concept of negative and positive logic b) Definition, symbols and truth tables of gates. Construction of NOT, AND and OR gates from NAND and NOR gates (universal gates). 5. Logic Simplification a) Postulates of Boolean algebra, DeMorgan's Theorems. 5. **Power Electronics** 1. Introduction to thyristors and other Power Electronics Devices SCR - Different methods of SCR triggering. - Different commutation circuits for SCR. - Construction & working principle of DIAC, TRIAC & their V-I characteristics 2. Controlled Rectifiers 6. **Electrical Machines:** (a): D.C. Machine – Construction, Basic Principles of D.C. motors and generators, their characteristics (b): 1 phase and 3 phase transformers – Construction, Principles of operation,

	equivalent circuit,Tests, Losses and efficiency. (c):3 phase induction motors, rotating magnetic field, principle of operation, equivalent circuit, torque-speed characteristics. 7. **Unit and Measurement:** Definition, Classification, Fundamental and derived units, systems of units: FPS, CGS, MKS, Unit of physical quantities, symbols, Conversion factors, Measurements of mechanical quantities, electrical quantities. 8. **Work Power and Energy:** Definition, Work and its units, Measurements of Work, Work done on bodies moving on horizontal and inclined planes (Consider frictional forces also) Concept of Power and its units, Calculationsof Power (Simple cases). 9. **Measurement and measuring instruments:** Measurement of power (1phase and 3 phase, both active and re-active) and energy, 2 wattmeter method of 3 phase power measurement. Measurement of frequency and phase angle. Ammeter and voltmeter (both moving oil and moving iron type), extension of range wattmeter, Multimeters, Megger, Energy meter, AC Bridges, Use of CRO, Signal Generator, CT, PT and their uses. 10. **Sensors and Industrial Instrumentation:** Resistive Capacity, Inductive, piezometric, Half effect sensors and associated signal conditioning circuits, Transducers for industrial instrumentation, Displacement (Linear and Angular).
Mechanical Engineering and combination of various streams of Mechanical Engineering	**(1) Welding** Type of welding (Arc welding & gas welding), TIG & MiG welding, Brazing and soldering, welding defects, maintenance of tools and machines **(2) Turning** Basic principle of turning, description and specification of lathe machine, operations of lathe e.g. turning, taper turning, kurling, thread cutting etc., maintenance of lathe. **(3) Machining** Metal cutting principles, cutting tool, basic principles of machining with milling and drilling, shaping machine, grinding etc., machining tool, maintenance of machines. **(4) Mechanic (Diesel)** Parts of engine, engine combustion, cooling and lubrication, engine performance, super charging, maintenance of engine. **(5) Pump mechanic** Working and performance of reciprocating and centrifugal pump, pipe fitting systems, maintenance of pump. **(6) Refrigeration & Air conditioning** Refrigeration cycle, principle of refrigeration plant, vapour compression and absorption system, Air conditioning system, maintenance of refrigeration and air conditioning system.

	(7) Fitting Functions and working of fitting tools such as files, chisels, scrapers, try squares etc., maintenance of all tools. **(8) CNC Operation** Components and function of CNC operation, handling of CNC machines, robots.
Civil Engineering and combination of variousstreams of Civil Engineering	**UNIT I** **Surveying:** Introduction, History and principles of chain survey. Classification, accuracy, types of chains and tapes. Direct and Indirect ranging. Compass survey: Instrument and its setting up, Bearing and each included angle of close traverse. Local attraction. Magnetic declination and its true bearing. Precaution in using prismatic compass. **Levelling:** Auto level, dumpy Level, Tilting Level - introduction, definition · Principle of levelling. Levelling staffs, its graduation & types. Temporary and permanent adjustment, procedure in setting up. Level & horizontal surface. Datum Benchmark, Focusing & parallax Deduction of levels / Reduced Level. Types of leveling, Application to chain and Levelling Instrument to Building construction. Reciprocal levelling. **UNIT II** Contouring: Definition, Characteristics, Methods. Direct and Indirect methods · Interpolation of Contour, Contour gradient, Uses of Contour plan and Map. Application of contouring for road project. Theodolite survey: Introduction. Types of theodolite. Uses, Methods of Plotting. Transit vernier theodolite. Terms of transit theodolite. Fundamental line of theodolite. Adjustment of theodolite. Total Station: Introduction. Components parts, accessories used. **GPS (Global Positioning System):-** · Introduction of GPS system. · Definition and application of Remote sensing. **UNIT III** **Water supply:** Introduction. Terms used in PHE. Various types of water supply pipes and fittings. Material specification. Type of overhead and underground water tanks. Tools and equipment's used in water supply system. Basic concept, terminology and process used in Water treatment plant · **UNIT IV** Systems of sanitation. System of house drainage. plumbing, sanitary fittings, etc. Types of sewer appurtenance. Systems of plumbing. Type of sewage disposals. Manholes, soak pit & Septic tank. Basic concept, terminology and process used in Sewerage treatment plant.
Chemical Engineering/Chemistry and combination of various streams of Chemical Engineering/Chemistry	**Chemical Plant and Chemical Engineering** 1. Introduction of glass wares used in Laboratory: Introduction of Chemistry, branches of chemistry, Importance of chemistry, Safety precautions in Chemistry/Chemical Engineering Laboratory, Different equipment and apparatus used in Laboratory, Various fire extinguishers, Chemical hazards, MSDS

	2. Acid-base titration: Atom, Molecule, Element, Compound, Mixture, Physical change, Chemical change, Acids, Bases, Salts & their properties, Molecular weight, Equivalent weight, Atomic weight, Normality, Molarity, pH Measurement, Concentration measurement, 3. Simple Distillation, Fractional Distillation, Purification processes, Boiling point, Melting point 4. Measuring instruments: Bourdon tube pressure gauge, Mercury in glass thermometer, Bimetal thermometer, RTD, Thermocouple, Orifice meter, Venturi meter, Rotameter, Sight glass level indicator, Air purge level indicator, Hydrometer, Control valve 5. Pumps and Compressors: Centrifugal pump and compressor, Pipe joints
Computer Science and Engineering and combination of various streams of Computer Science & Engineering	**Unit-I: Computer Organization and Architecture** Binary representation, registers, Instruction set, timing and control, CPU, instruction cycle, addressing modes, CISC, RISC, synchronization, interrupt and exception, privileged and non-privileged instruction, hierarchical memory organization, memory mapping, cache memory, coherence, consistency, virtual memory, interleaving, DMA, Signed number, fixed and floating point numbers, control unit design, arithmetic and instruction pipelining: throughput, speedup, branch prediction, hazards **Unit-II: Programming, Data Structures, Algorithms, and Theory of Computation** Programming in C, pointers, basic data structures, array, string, stack, queue, recursion, linear and non-linear data structures, searching and sorting algorithms, complexity and asymptotic analysis, Mealy and Moore machine, finite automata, Determinism and non-determinism, Regular expressions, minimization of deterministic finite automata PDA, regular grammar, CFG, Chomsky's hierarchy, closure properties, pumping lemma, Turing machine, halting problem **Unit-III: Operating System and Database Systems** Basics of Popular Operating Systems (Linux & Wndows), File and Directory Management, purpose of database system, Data Models, ER-Model, Introduction to UML, keys, integrity rules, Relational Database design, Normalization, Selection and projection, Joins, SQL: data definition, aggregate function, Null Values, nested sub queries, Joined relations, ACID properties, serializability and concurrency control, Lock based concurrency control (2PL, Deadlocks),Time stamping methods **Unit-IV: Computer Networks and Web technologies** Basic of Computer networks; LAN, WAN, OSI reference model, TCP/IP, sliding window protocol, Channel allocations problem, Ethernet, Wireless LAN, Broadband Wireless, routing algorithms, Congestion control algorithms, IPv4 and IPv6, Quality of Service, UDP and TCP, Domain name system, electronic mail, World Wide Web: architectural overview, dynamic web document and

	http, File Transfer Protocol, Simple Mail Transfer Protocol, Telnet, Concept of Internet, Applications of Internet, Search Engines

C. Manner for drawing final merit list for selection:

(i) The written examination for Paper-I (stage-1) shall be conducted first. Those candidates who will qualify in Paper-I shall only be eligible to appear for Paper-II Examination (Stage-2). The venue & date of examination will be communicated in due course of time.

(ii) The answer script for Paper-II of a candidate will be evaluated **only** for the candidates who qualifies in Paper-I.

(iii) The final merit list shall be drawn on the basis of scores of Paper II only.

(iv) In case of tie/bunching/bracketing of candidates in the final results, the following criteria shall be adopted in the following sequential order for deciding Merit list:

(a) The candidate with higher marks in Paper-II shall be placed higher on the merit list or
(b) If (a) above is same, the candidate with lower negative marks in Paper-II, shall be placed higher on the merit list, or
(c) If (a) & (b) above is same, the candidate with higher marks in Part B of Paper-II shall be placed higher on the merit list, or
(d) If (a), (b) & (c) above is same, the candidate senior in age shall be placed higher on the merit list, or
(e) In case option at (a), (b), (c) & (d) are exhausted, it will be decided through draw.

Note:

- **Any guidelines/instructions received from Ministry of Education, Government of India till the date of completion of Selection process will be made applicable.**
- **The Date, Time, Venue of examination will be communicated in due course of time. The candidates are requested to regularly check the institute website for all updates.**

This is issued with the approval of the Competent Authority.

-sd/-
REGISTRAR